AEROSPACE MATERIAL SPECIFICATION

AMS6471™	REV. K

Issued 1965-02
Reaffirmed 1999-01
Revised 2023-12

Superseding AMS6471J

Steel, Nitriding, Bars, Forgings, Mechanical Tubing,
and Stock for Forging,
1.6Cr - 0.35Mo - 1.13Al (0.38 - 0.43C) (135 Mod),
Premium Aircraft Quality,
Consumable Electrode Vacuum Remelted
(Composition similar to UNS K24065)

RATIONALE

AMS6471K is the result of a Five-Year Review and update of the specification. The revision updates the Title in line with the Scope and Quality of the product, adds composition reporting information (see 3.1.1), clarifies macrostructure requirements (see 3.4.1 and 8.8), updates hardenability requirements (see 3.4.3), revises decarburization testing methods (see 3.4.4.5), adds ordering options for forging stock (see 4.4.3 and 8.8), adds information on ordering bar (see 8.5), and updates the prohibition on product exceptions (see 4.4.4 and 8.7).

1. SCOPE

1.1 Form

This specification covers a premium aircraft-quality, low-alloy steel in the form of bars, forgings, mechanical tubing, and forging stock.

1.2 Application

These products have been used typically for nitrided parts requiring high surface hardness, resistance to heat, and less distortion than parts fabricated from steel requiring quenching to case harden and subject to very rigid inspection standards, but usage is not limited to such applications. This steel may be case hardened in dissociated ammonia gas to provide a minimum case hardness of 900 HV.

2. APPLICABLE DOCUMENTS

The issue of the following documents in effect on the date of the purchase order forms a part of this specification to the extent specified herein. The supplier may work to a subsequent revision of a document unless a specific document issue is specified. When the referenced document has been cancelled and no superseding document has been specified, the last published issue of that document shall apply.

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
Tel: +1 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
SAE WEB ADDRESS: **http://www.sae.org**

For more information on this standard, visit
https://www.sae.org/standards/content/AMS6471K

2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

AMS2251 Tolerances, Low-Alloy Steel Bars

AMS2253 Tolerances, Carbon and Alloy Steel Tubing

AMS2259 Chemical Check Analysis Limits, Wrought Low-Alloy and Carbon Steels

AMS2300 Steel Cleanliness, Premium Aircraft-Quality, Magnetic Particle Inspection Procedure

AMS2370 Quality Assurance Sampling and Testing, Carbon and Low-Alloy Steel Wrought Products and Forging Stock

AMS2372 Quality Assurance Sampling and Testing, Carbon and Low-Alloy Steel Forgings

AMS2806 Identification Bars, Wire, Mechanical Tubing, and Extrusions, Carbon and Alloy Steels, and Corrosion and Heat-Resistant Steels and Alloys

AMS2808 Identification, Forgings

AS1182 Standard Stock Removal Allowance, Aircraft-Quality and Premium Aircraft-Quality Steel, Bars and Mechanical Tubing

AS7766 Terms Used in Aerospace Metals Specifications

2.2 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org.

ASTM A255 Determining Hardenability of Steel

ASTM A370 Mechanical Testing of Steel Products

ASTM A604 Macroetch Testing of Consumable Electrode Remelted Steel Bars and Billets

ASTM A751 Standard Test Methods, Practices, and Terminology for Chemical Analysis of Steel Products

ASTM E112 Determining Average Grain Size

ASTM E140 Hardness Conversion Tables for Metals Relationship Among Brinell Hardness, Vickers Hardness, Rockwell Hardness, Superficial Hardness, Knoop Hardness, Scleroscope Hardness, and Leeb Hardness

ASTM E1077 Standard Test Methods for Estimating the Depth of Decarburization of Steel Specimens

2.3 Definitions

Terms used in AMS are defined in AS7766.

3. TECHNICAL REQUIREMENTS

3.1 Composition

Composition shall conform to the percentages by weight shown in Table 1, determined in accordance with ASTM A751 or by other analytical methods acceptable to the purchaser.

Table 1 - Composition

Element	Min	Max
Carbon	0.38	0.43
Manganese	0.50	0.80
Silicon	0.20	0.40
Phosphorus	--	0.015
Sulfur	--	0.015
Chromium	1.40	1.80
Molybdenum	0.30	0.40
Aluminum	0.95	1.30
Nickel	--	0.25
Copper	--	0.35

3.1.1 The producer may test for any element not listed in Table 1 and include this analysis in the report of 4.4. Reporting of any element not listed in the composition table is not a basis for rejection unless limits of acceptability are specified by the purchaser.

3.1.2 Check Analysis

Composition variations shall meet the applicable requirements of AMS2259.

3.2 Melting Practice

Steel shall be multiple melted using vacuum consumable electrode practice in the remelt cycle.

3.3 Condition

The product shall be supplied in the following condition; hardness and tensile strength shall be determined in accordance with ASTM A370:

3.3.1 Bars

3.3.1.1 Bars 0.500 inch (12.70 mm) and under in nominal diameter or least distance between parallel sides shall be cold finished having tensile strength not higher than 135 ksi (931 MPa), or equivalent hardness (see 8.2).

3.3.1.2 Bars Over 0.500 inch (12.70 mm) in nominal diameter or least distance between parallel sides shall be hot finished and annealed, unless otherwise ordered, having hardness not higher than 229 HBW, or equivalent (see 8.3). Bars ordered cold finished may have hardness as high as 269 HBW, or equivalent (see 8.3).

3.3.1.3 Bar shall not be cut from plate (see 4.4.2).

3.3.2 Forgings shall be as ordered.

3.3.3 Mechanical tubing shall be cold finished unless otherwise ordered, having hardness not higher than 25 HRC, or equivalent (see 8.3). Tubing ordered hot finished and annealed shall have hardness not higher than 99 HRB, or equivalent (see 8.3).

3.3.4 Forging stock shall be as ordered by the forging manufacturer.